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AUTHOR Rees, Alan M.; And Others
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ABSTRACT

Case Western Reserve University added training in MEDLINE analysis to its health sciences librarianship program in 1974, with help and some funding from the National Library of Medicine and with the cooperation of the Cleveland Health Sciences Library. MEDLINE was introduced at a 2-1/2 day intersession in January, and a MEDLINE module was included in a spring semester course on health sciences communications networks in which 29 students enrolled. Lectures covered the characteristics of the MEDLINE network and several data bases, access via Tymshare and direct dial, types of terminals, log-in procedures, computer physiology, boolean logic, commands, question analysis and user interaction, Medical Subject Headings (MeSH), use of MeSH tools, and principles of coordinate indexing. Laboratory sessions paralleled the lectures, and students were given access to MEDLINE in connection with field work assignments. Evaluation by students and faculty led to the conclusion that MEDLINE training was well received and worthwhile to students, though the high cost of terminals, computer time, telephone, and other tools may make some kind of subsidy necessary for future courses. A course outline is included, along with a list of equipment and indexing tools and a copy of the evaluation questionnaire for students. (LS)

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AN EXPERIMENT IN TEACHING MEDLINE +

by

Alan M. Rees *

Lydia Holian **

Ann Schaap ***

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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+ Paper presented at the Annual Meeting of the Medical Library Association, Cleveland, Ohio, June 4, 1975

* Alan Rees is Professor and Associate Dean, School of Library Science, CWRU.

** Lydia Holian is Associate Librarian, Allen Memorial Library, CWRU, and Adjunct Professor, School of Library Science.

*** Ann Schaap is Reference Librarian, Allen Memorial Library, CWRU, and Adjunct Professor, School of Library Science.

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I. INTRODUCTION

In June 1967 the School of Library Science at Case Western Reserve University (CWRU) initiated a specialized training program in Health Sciences Librarianship within the M.S. in L.S. curriculum. During the first seven years of its operation (1967-1974) there were 131 graduates, of whom 88 (67.56%) entered into employment within health sciences libraries. Generous support, financial and otherwise, has been provided by the National Library of Medicine.*

The basic objectives of the training program have remained unchanged since 1967 -- to educate librarians capable of responding in an innovative manner to emerging social needs and technological challenge. As part of our teaching, students have been exposed both to the changing scenario of the health sciences and to the emerging library and communications networks. Continuing emphasis has been place upon fashioning a specialized, health-related curriculum which goes beyond the traditional, introductory, and often terminal, course in medical librarianship.

The evolutionary nature of the CWRU program is reflected in the design of new courses for the purpose of imparting incremental skills and knowledge -- Health Sciences Communications; Organization of Medical Practice and Research; History of Medicine; and Health Sciences Library Networks. Most recently, field work has been added as a requirement of the program involving between 15 and 20 hours per week of supervised and structured, educational experience within a variety of health sciences library settings -- university

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* Through the Extramural Program, LM-00123-01/6.

health center and medical society library (Cleveland Health Sciences Library), departmental libraries of the School of Medicine such as Biometry, Anesthesiology and Biochemistry, and a number of libraries such as at the Wade Park Veterans Administration, St. Alexis, Mt. Sinai and St. Luke's hospitals. Three hours of academic credit are granted upon satisfactory completion of the field work requirements.

Last year, it became obvious that MEDLINE training is increasingly required in view of the advancing state of information technology and the job market. As a consequence, it was decided to explore the feasibility of adding MEDLINE training. Up to that time MEDLINE had been demonstrated in the School of Library Science, but not taught to students for the purpose of training MEDLINE analysts.

In August 1974, the principal author attended the three week training course at the National Library of Medicine. A short critique of the course was prepared entitled "MEDLINE in the Classroom." (1) In that paper, it was argued that MEDLINE should be taught not as a isolated technological skill but rather as a highly useful, if not indispensible, tool in a total library system; that technical knowledge of MEDLINE should be embedded within a context of multiple data bases in a network configuration; that MEDLINE should be taught with explicit reference to real information needs of personnel in the health sciences; and that to provide the broader conceptual context, basic MEDLINE training should be transferred from NLM to a university setting. The criteria for selection of participating universities should be the existence of a library school with demonstrated competence in medical librarianship possessing close ties with a university

medical center and adjacent health sciences libraries and with access to operational MEDLINE expertise.

Discussions with NLM staff revealed a willingness to participate in testing the feasibility of providing MEDLINE training within the context of library school education. Backup resources in terms of technical support and materials were offered to CWRU by the MEDLINE staff at NLM and training grant funds were authorized for the rental of four computer terminals.

II. COURSE DESIGN

The resources of the School of Library Science and the Cleveland Health Sciences Library were assembled for the offering of the course. Release time for the two MEDLINE analysts at the Cleveland Health Sciences Library, (CHSL) Mrs. Lydia Holian and Mrs. Ann Schaap, was given by Mr. Robert Cheshier, Director of CHSL. In addition, laboratory and classroom space was supplied within the Allen Memorial Library of CHSL. The design and implementation of the MEDLINE module was a joint effort of the three authors, involving the necessary partnership of the School of Library Science and CHSL. The success of the Medical Library Training Program at CWRU has been based upon such cooperative effort.

The MEDLINE module was embedded in a Spring Semester course entitled "Health Sciences Communications Networks." At least one half of the sixteen week course was devoted to the presentation of a model of communication in the health sciences involving the evolution of information from informal through formal channels of information transfer. The transformation of oral communication to the primary (journal) literature was described with the subsequent generation of secondary publications. The production of

bibliographic data bases, leading to both printed products and computer-based services was discussed in relation to a number of data bases -- Biological Abstracts, Chemical Abstracts, Science Citation Index, Excerpta Medica and Index Medicus. Computer processing of these data bases in both batch and on-line modes was demonstrated and contrasted. Access to health sciences information on a local, regional and national basis was described in several lectures on the Regional Medical Library Program and the Biomedical Communications Network (BCN). (Table 1)

Within this conceptual framework the operation of the MEDLINE system was taught. It is to be noted that the training at CWRU was not conducted on a "crash" basis within a short period of time; nor was the training divorced from realistic work settings. More than half of the students performed MEDLINE searches in connection with their field work assignments in health sciences libraries involving live interaction with users. In essence, the MEDLINE module was embedded in a total health sciences communications context rather than taught as an independent technology crammed within the shortest possible time span.

III IMPLEMENTATION

The course with its MEDLINE module was preceded by a short intersession offering, in January, of two and a half days to present the essential elements of the MEDLINE network, the MeSH, and the various data bases available. In addition to the CWRU faculty, Dr. Clifford Bachrach of NLM lectured on MeSH architecture. The total time involved in the intersession was 17 hours including videotapes and color slide and audiotape descriptions

Table 1 HEALTH SCIENCES COMMUNICATIONS NETWORKS L.S. 593
Spring Semester, 1975

Alan M. Rees

Weeks	Session A (2 hrs.)	Session B (2 hrs.)	Session C (Labs)
1.	INTRODUCTION Model: Informal Primary Secondary Tertiary levels	Informal Communication in the Health Sciences	
2.	Primary Publications -- Journals	Secondary Publications -- Publications Major data bases - Computer files	
3.	2/18 Biological Abstracts	2/20 Chemical Abstracts	Groups: 1. Tuesday 8:00-10:00 a.m. 2. Wednesday 4:00-6:00 p.m. 3. Thursday 8:00-10:00 p.m. 4. Friday 8:00-10:00 a.m.
4.	2/25 Science Citation Index (AR)	2/27 Batch Vs On-Line Access (AR)	---
5.	3/4 On-Line Access-- Characteristics (AR)	3/6 Midterm	3/7 VIDEO Tape: Thelma Charen on MeSH
6.	3/11 Network; Computer Physiology; Boolean Logic (AR)	3/13 Unit Record: MEDLINE and SDILINE: Search Strategy (AS)	Labs (L.H; A.S; AR)
7.	3/18 Search Strategy and Print Commands (AS)	3/30 Commands; Question Analysis (AR)	Labs
8.	3/25 Vacation	---	---
9.	4/1 MeSH Coordinate Indexing; Trees and Hedges; Indexing Tools	4/3 Continued (L.H; A.S; AR)	Labs

Table 1 HEALTH SCIENCES COMMUNICATIONS NETWORKS L.S. 593
Spring Semester, 1975 Alan M. Rees

Weeks	Session A (2 hrs.)	Session B (2 hrs.)	Session C (Labs)
10.	4/8 MeSH Categories (NLM)	4/10 MeSH Categories (NLM)	Labs
11.	4/15 MeSH Categories (L.H)	4/17 MeSH Categories (L.H.)	Labs
12.	4/22 MeSH Categories; Print Off-Line (L.H)	4/24 SERLINE (A.S.)	Labs
13.	4/29 CATLINE (A.S.)	4/31 TOXLINE/CHEMLINE/ CANCERLINE	Labs
14.	5/5 RML and BCN	5/7 Orbit II; RECON; SUNY; Data Communication Networks	Labs
15.	5/12 MEDLINE Review (L.H)	5/14 MEDLINE Review (A.R.)	Labs
16.	5/19 EXAM	-- EXAM --	

of MEDLINE.*

The module itself, apart from the intersession, consisted of eight weeks involving 32 hours of lectures and 18 hours of laboratory work on the terminals (2 hours for each student in nine weekly sessions). In addition to the 75 hours of formal lecture and laboratory time, students viewed in a group the videotapes of Thelma Charen discussing the principles and techniques of indexing.** (Table 2)

Approximately eight hours of the lectures were devoted to a description of the characteristics of the MEDLINE network, access via Tymshare and direct dial, types of terminals, log-in procedures, computer physiology, boolean logic, commands and the essentials of question analysis and user interaction. Little difficulty was encountered in either the explanation of the understanding of these features of system operation.

Sixteen hours of lectures, over a four week period, were given on the MeSH categories. These lectures were supplemented by eight additional hours presented by Perri Schuyler of NLM. The presentations stressed the structure and usage of the basic MeSH tools, the structure of the various categories and the essential principles of coordinate indexing. Laboratory sessions paralleled the lectures so that students could perform exercises in the various categories on-line under supervision. Three lectures were devoted to SERLINE, CATLINE, TOXLINE, CHEMLINE AND CANCERLINE, with accompanying terminal exercises.

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* Medlars on-line (MEDLINE), V3008-X, Videotape, 23 minutes; MEDLARS: Capabilities and Limitations, S-3136-X, 31 2x2 color slides with cassette audiotape, 18 minutes; MEDLINE-IN-CONTEXT, S-3137-X, 30 2x2 color slides with cassette audiotape, 12 minutes.

Table 2

MEDLINE MODULE

INTERSESSION (January)	17	HOURS
SPRING SEMESTER (March-May)		
LECTURES	32	HOURS
LABORATORY	18	HOURS
GUEST LECTURES	8	HOURS
	75	TOTAL HOURS
INDEPENDENT TERMINAL USAGE BY STUDENTS	10	HOURS (AVERAGE)

In addition to the on-line exercises required as part of the formal laboratory sessions, students were permitted to access the MEDLINE System in connection with their field work assignments. Some 20 students used the terminals for this purpose. They were instructed to use the system at non-peak hours and to discuss their search formulations with the instructors prior to logging in. One student designed and pilot tested an automated current awareness service at the Veterans Administration hospital in Cleveland, and performed more than 100 searches in connection with this effort. (2) Other students performed searches for users of the Biochemistry, Anesthesiology, Pediatrics and Medical-Surgery departmental libraries in the School of Medicine, the Poison Control Center, several hospital libraries and the Cleveland Health Sciences Library. In all, approximately 300 such work-related searches were performed. The educational value of this activity is obvious and the insight gained was reflected in the results of the final exam.

IV STUDENT BODY

The total number of students was 29. Eighteen were American Students; eight were from abroad representing Nigeria, Mexico, Korea, Yugoslavia, Hong Kong, Thailand and India; three were staff members of the Cleveland Health Sciences Library. As a whole, the class had considerable library experience -- six of the eight international students are practicing librarians in medical schools and hospitals in their own country, three of the students are graduate reference librarians at CHSL, while several other students had previously worked as pre-professionals in medical libraries. It is to be noted that <u>all</u> of the students were employed in field work assignments of

about 15-20 hours per week in local health sciences libraries.

V EQUIPMENT AND INDEXING TOOLS

Four Texas Instrument 733 terminals were used. Usage was made of the local Tymshare node. However, since Cleveland Tymshare can accomodate only two simultaneous users, it was necessary to use WATS lines of the University to access Tymshare in Columbus and Detroit. The result was that usage of these lines for periods of several hours at a time almost brought the university's long distance telephone system to a standstill. Finally, usage had to be limited to one WATS line, supplemented by local Tymshare and sparing use of in-WATS at NLM. The four terminals and telephones were placed in a laboratory setting. Laboratory sessions consisted of eight students in each group with each terminal being shared by two students. The final exam was also conducted in a number of sessions to permit individual usage of the terminals.

Difficulties were encountered with respect to the number of indexing tools available. Eight sets were provided of the following:

Medical Subject Headings, Alphabetical List, 1975 (PB 234-189)

Medical Subject Headings, Three Structures, 1975 (PB 234-190)

Permuted Subject Headings, 1974 (PB 221-463)

MEDLINE Reference Manual, 1975 (PB 222-991)

Eponymous Syndromes: MEDLARS Indexing Instructions, 1970.

MEDLINE Titles with JTC and ISSN, NLM, n.d.

List of Journals Indexed in Index Medicus, NIH 74-267, 1974.

Tumor Manual, MEDLARS Indexing Instructions, 1970.

Key to Indexing of Enzymes, 18p. NLM, 1974.

MEDLARS Training Program: MEDLINE Training Syllabus.
Thelma Charen, 1972. (1 only).

Cumulated List of New Medical Subject Headings, 1963-1973
(PB 219-054). (1 only)

Medical Subject Headings: New Main Headings and Provisionals, 1974.
(PB 226-906/AS).

MEDLARS Indexing Manual. (PB 207-181).

VI STUDENT PERFORMANCE

Three tests were given in connection with the total course:

1. A midterm covering conceptual understanding of the generation of data bases and on-line access. (Appendix 1)
2. A review exam which involved the theory of MeSH, Boolean logic, coordinate indexing and search formulation. This exam, substantially the same as the NLM final test without terminal exercises, was given at midpoint in the MEDLINE module. (Appendix 2)
3. A final exam in five parts which covered system capabilities, MeSH and qualifiers, formulation and search strategy and computer mechanics. Questions were included on SDILINE, CATLINE, SERLINE, CHEMLINE AND CANCERLINE. (Appendix 3)

The performance of the students in the MEDLINE final was above average compared with most library school courses. The scores were as follows:

A	38.02%	---- 11 Students
B	48.20%	---- 14 Students
C	6.89%	---- 2 Students
D	6.89%	---- 2 Students

The best performance was achieved by those who had used MEDLINE in connection with their work-study assignments involving real usage. The three reference staff members also achieved high scores, possibly due to their familiarity with MeSH and its usage. The lower performance scored by the international students was probably occasioned by language problems.

VII STUDENT PERCEPTION OF COURSE

A simple evaluation instrument was designed for student usage. (Table 3) In summary, 82.6% of the students believed that the MEDLINE module should

You need not sign this questionnaire. Please return to Alan Rees

Table 3 Library Science 593 Evaluation

SA-if you strongly agree
A-if you agree
N-if you neither agree nor disagree
D-if you disagree
SD-if you strongly disagree

1.	The course should be optional.	SA A N D SD
2.	The course content was substantial and relevant.	SA A N D SD
3.	The course content was well arranged and presented.	SA A N D SD
4.	Effective coordination existed between the three instructors.	SA A N D SD
5.	The Intersession introduction was valuable.	SA A N D SD
6.	The guest lecturer during the Intersession was helpful.	SA A N D SD
7.	The guest lecturer during the class in April was helpful.	SA A N D SD
8.	I have become more competent in Medical Librarianship due to this course.	SA A N D SD
9.	The class lectures were clear and well presented.	SA A N D SD
10.	Laboratory supervision was adequate.	SA A N D SD
11.	Laboratory time was adequate.	SA A N D SD
12.	The instructors were receptive to student opinions and questions.	SA A N D SD
13.	Numbering of indexing books and manuals were adequate.	SA A N D SD
14.	Examinations reflected the material taught.	SA A N D SD
15.	I feel that this course challenged me intellectually.	SA A N D SD
16.	I would recommend this course to others.	SA A N D SD
17.	The instructors are enthusiastic and dedicated.	SA A N D SD
18.	The instructors are easily available to students.	SA A N D SD
19.	The videotapes on indexing (Thelma Charen) were helpful.	SA A N D SD
20.	The videotapes on the MEDLINE system (William Caldwell) were helpful.	SA A N D SD

continue to be mandatory for all students in the medical library program; 91.3% that the course content was substantial and relevant; 60.8% that the subject content was well arranged and presented; 65.2% that the class lectures were clear and well presented; 56.5% that the laboratory supervision was adequate; 74% that the laboratory time was adequate; 17.3% that the number of copies of the indexing tools was adequate; 95% that the course challenged them intellectually; 91.3% would recommend the course to others; and 100% of the respondents believed that they had become more competent in Medical Librarianship as a result of the course.

Clearly, the course met with enthusiastic response. However, students were not happy with the number of indexing tools supplied (approximately one copy for four students); felt that more laboratory supervision should be supplied (one group met with a peculiar combination of down-time, competing meetings and illness of one of the lecturers); and did not like some of the audio-visual aids in that they were too superficial.

VII CONCLUSIONS

The design and presentation of a MEDLINE course in a School of Library Science has been challenging and stimulating. It was made possible at CWRU by a combination of factors:

1. Support and cooperation of the National Library of Medicine which provided outlines, exercises, tools, advice and consultant assistance.

2. Financial support from both the Extramural Program and the Office of the Associate Director for Library Operations for rental of terminals and connect time.
3. Cooperation of the Cleveland Health Sciences Library which supplied MEDLINE staff for educational purposes.
4. Enthusiastic reception of the learning opportunity by the students who readily perceived the value of MEDLINE training in their field work assignments and in their future careers.

It is patently obvious that MEDLINE training cannot be provided by part-time amateurs. No library school in the United States has the requisite competence for providing such training. In our opinion, training can best be provided by a combination of library school educational expertise which can embed MEDLINE in its professional context and operational expertise of MEDLINE analysts commited on a continuing basis to working with the system. Stated otherwise, training involves a partnership between a library school and health sciences library willing to release its MEDLINE staff for teaching purposes.

It is also evident that the work assignments of students in operational health sciences libraries assist the educational effort in the classroom in that students can observe the usage of MEDLINE in a library context. Our students engaged in reference interviews, search formulations and relevance evaluations in direct relationship with health sciences personnel. In all, they performed some 300 searches for real users.

Finally, the implementing of a MEDLINE course is highly expensive in terms of time and cost. Much more time is involved than in teaching most library school courses. In addition to the extensive laboratory, lecturing

and tutoring time involved, continuous problems were experienced with respect to scheduling, terminals, telephones, tools and equipment. It appeared that Murphy's Law prevailed at all times.

Financially, the course required an estimated expenditure of $12,350 in an average cost of per student. These expenditures were estimated as follows:

Personnel Time	3,000
Terminal Rental	2,500
On-line, connect time (400 hrs)	6,000*
Telephone Rental	350
Telephone calls	500*
	12,350.

These expenses cannot be totally borne by students. Some form of subsidy is necessary, whether from the National Library of Medicine or the Regional Medical Library Program. Although it is reasonable to require that a library school support the expense of personnel time, the incremental expenses involved requires some transfer of funds to the school and to the participating health sciences library to offset the loss of time on the part of the MEDLINE analysts engaged in the teaching.

It is to be noted that the real recipients of the savings involved in MEDLINE training at library schools would be the employing libraries who would be the employing libraries who would no longer need to send a staff member to Bethesda for the three week course. This would involve a savings of some $800 for each person. Also the Regional Medical Library Program is relieved of some of its educational responsibilities. Some benefit would doubtless occrue to the National Library of Medicine in that the persons trained in library schools would not need NLM training. Since NLM

* Estimated

is not primarily a teaching institution, the maintenance of an in-house training program is costly and disruptive.

Consideration of the comparative financial costs of NLM-based and library school-based MEDLINE training should not obscure the fact that the latter, if properly conducted, by educational professionals could provide a superior learning experience for students, especially if embedded in operational settings. We believe that we have demonstrated the feasibility of conducting MEDLINE training in a library school curriculum and that the student performance is at least equal to that gained by participants in the NLM three week course.

References

1. Rees, Alan M. "MEDLINE in the Classroom," August 1974, 12p.

2. Burwell, Janet, "Automated Current Awareness in a Veterans Administration Hospital," April 1975, 10p.